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ABSTRACT

A study of patterns of health behavior among rural and small-town children surveyed 1,950 K-6 students from seven southern Illinois elementary schools. Findings indicate that less than half of the students ate the recommended amounts of fruits, vegetables, and grain each day. Males and females smoked at about the same rates, but sixth-grade boys drank significantly more than sixth-grade girls. Boys fought and shot guns without adult supervision significantly more than girls, but there was no gender difference in bringing weapons to school. Twenty percent of students knew someone who had brought a weapon to school. About 50 percent of students rode a bike each day or played on a sports team, and 8 percent walked to school. Seatbelt use decreased from 94 percent in kindergarten to 77 percent in the sixth grade, with no significant difference between boys and girls. Fifty six percent of second graders wore a helmet when riding their bike, compared to 19 percent of sixth graders. Tooth brushing and hand washing did not vary by grade level, with 88 percent reporting daily tooth brushing and 93 percent reporting washing their hands after going to the bathroom. In general, older children were less likely to engage in positive health behaviors. The most consistent gender difference was in regard to fighting and weapons, with boys reporting much higher rates. School-based programs implemented in partnership with community health programs and focused mass-media activities are recommended to help children develop healthy habits. (Contains 19 references.) (TD)

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Health Behaviors of Elementary School Children in Rural Southern Illinois

by Paul D. Sarvela and Eduardo A. Monge[1]

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Illinois mortality statistics suggest that a large proportion of deaths, especially premature deaths, are related to poor health behavior practices. The three leading causes of death in Illinois are heart disease, cancer, and stroke; each is strongly related to personal health behavior. For example, risk of heart disease is related to nutrition, exercise, and smoking. Cancers are linked to smoking and poor nutrition, while stroke is related to hypertension, exercise, nutrition, and smoking. Several leading causes of death for Illinois children (e.g., unintentional injuries and homicide) are also linked to behavior (IPLAN 1996).

Many large national surveys, such as the Behavioral Risk Factor Surveillance System implemented by the Centers for Disease Control and Prevention, have been used to study the health behaviors of Americans. These studies have been adapted and extended to junior and senior high school populations and are used by public health specialists to plan health education and promotion programs for these target groups.

Although there is a large body of research on junior and high school populations, few studies have focused on the health behaviors of young children. With regard to nutritional behavior, Krebs-Smith et al. (1996), in their study of child and adolescent fruit and vegetable intake, found that only 16 percent of boys and 18 percent of girls ate the recommended daily amount. This is not surprising but is, of course, disturbing given that proper nutrition is essential for healthy growth and development of youngsters. One study of 1,314 elementary school children found that male fourth-grade students used alcohol at significantly higher rates than female fourth-grade students (Loveland-Cherry, Leech, Laetz, and Dielman 1996). A similar study of fourth-, fifth-, and sixth-grade students conducted in rural New Hampshire found that boys reported drinking alcohol at higher rates than girls and that use increased significantly with age (Stevens, Youells, Whaley, and Linsey 1991).

Injuries are responsible for more deaths among children than any other cause, with two critical areas of concern being bicycle safety and the use of seatbelts. Several studies have shown that the use of helmets by elementary school bicycle riders is low. A study of 1,006 third- through sixth-grade children found that only 3.1 percent reported frequent use of a helmet (Jones, King, Poteet-Johnson, and Wang 1993). Kimmel and Nagel's 1990 study of 276 children in a suburban school district (grades four to eight) showed that only 2.6 percent of the students frequently wore a helmet. A more recent study of junior high school age children in Florida by Liller and colleagues (1998) showed that while 38.1 percent of the sample owned a helmet, only 15.89 percent wore the helmet the last time they rode their bikes.

Tooth brushing is an important aspect of oral health, yet a literature review found no current research available that examines this practice among American youth. Because hand washing is such an important method of reducing disease, it deserves study as well; however, the majority of studies in the literature focus on the hygiene practices of people in developing countries (Manun'Ebo et al. 1997; Wilson and Chandler 1992). One study of elementary school children shows that in an assessment of a scheduled hand washing program, those youngsters who were involved in the program were significantly less likely to be absent from school (Master, Hess-Longe, and Dickson 1997).

In a study focusing on fighting among elementary and high school youths, researchers found that about 50 percent of the third- to sixth-grade population had been in a fight during a one-month period of time (Fitzpatrick 1993). These data, plus the tragic events in schools throughout the United States, have begun to shape the opinions of school health policymakers. Former Surgeon General of the United States, Jocelyn Elders (1994) has indicated that violence is a major health-related problem in America.

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Research Objective

The objective of this study of elementary school children in southern Illinois is to identify health behavior patterns in this rural population. These data will be useful to those charged with the development and implementation of school health programs for elementary age children. Results will also add to the limited published work on this topic. Little current research focuses on the health behaviors of children, yet the elementary school years are when health behavior patterns, both positive and negative, begin to develop. In addition, most studies focusing on child health examine only one or two particular behavior problems. Further, we know little about the health behaviors of rural children.

Methods

Overview. Children from seven southern Illinois elementary schools took part in the study in Fall 1998 to identify patterns of health behavior among rural and small town students. These schools participated in an evaluation of a comprehensive school health education program implemented throughout southern Illinois.

Sample. Data were collected from 1,950 rural and small town elementary school children. Of the 1,950 students, 49.2 percent were male and 50.8 percent were female. The sample size by grade level ranged from 237 (fifth grade) to 311 (first grade). Students in this sample are typical of the rural southern Illinois elementary school population, coming from small towns and farms throughout the region. Although the schools were not selected based on a probability sample, they are reasonably representative of the rural and small town elementary school population of southern Illinois.

Instrumentation. Separate instruments, based on questionnaires used in a preliminary 1997 study, were developed for the kindergarten through sixth grades. Changes were made following the 1997 study results and input from a steering committee comprised of local health care, public health, and cooperative extension personnel who served as content validity reviewers for the instruments.

The revised forms of the seven instruments consisted of 19 behavioral questions and a varying number of knowledge questions. The behavioral questions (reported in this study) were identical for all grade levels, and were as follows:

1. Did you eat at least 2 helpings of fruit yesterday?
2. Did you eat at least 3 helpings of vegetables yesterday?
3. Did you eat at least 6 helpings of cereals, bread, rice, and pasta yesterday?
4. Have you ever tried smoking a cigarette?
5. Have you ever tried chewing tobacco or snuff?
6. Have you ever tried drinking a can, a glass, or a bottle of beer, wine, or liquor (not counting church)?
7. Have you ever been in a fight where someone was punched, hit, kicked, or hurt in some way?
8. Have you ever been in a fight at school where someone got hurt?
9. Have you ever carried, used, or shot a gun?
10. Have you ever brought a gun or knife to school?
11. Has someone you know ever brought a gun or knife to school?
12. Have you ever shot a gun without an adult present?
13. Do you walk to school?
14. Do you play on a sports team?
15. Do you ride a bike every day?
16. Do you wear a helmet when you ride your bike?
17. Do you wear a seatbelt when you ride in the car?
18. Do you brush your teeth every day?
19. Do you wash your hands after going to the bathroom?

Readability levels for the behavioral questions were estimated to be at the 3.2 grade level as measured by the Flesch-Kincaid reading test. (The instruments were read to students from kindergarten through third grade.) Behavioral questions were based on objectives from *Healthy People 2000* (USDHHS 1990). Reliability was .60, as estimated by Cronbach's alpha.

Data Collection Procedures. Study procedures were approved by Southern Illinois University's Human Subjects Committee before data collection took place. Next, approval to conduct the survey was obtained from each school principal. A letter was sent home to parents describing the study and asking those who chose not to have their

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youngsters participate to send a note back to the teacher indicating their wishes. In addition, during the data collection procedures students were told that participation was optional and that they did not have to answer any or all of the questions on the survey.

Students in kindergarten and first grade were given the test via personal interviews. Second- and third-grade students had the instrument read to them as a class using group administration procedures. Children in fourth through sixth grades self-administered the questionnaire proctored by university staff and students.

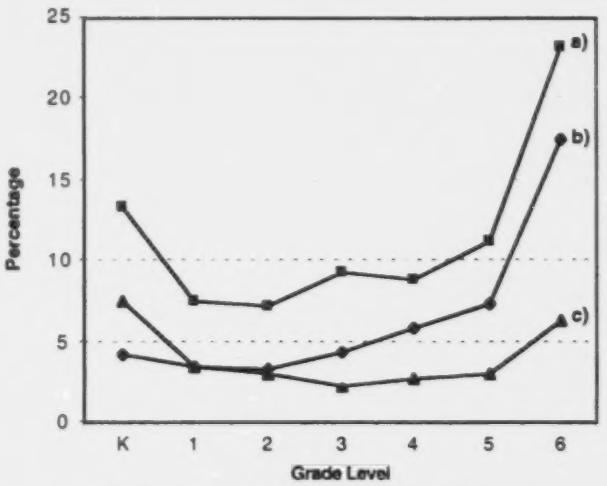
Data Analysis Procedures. All 1,950 completed questionnaires were used in the analysis. Questionnaire responses were transferred onto scantron forms and read by an optical scanning machine. Descriptive procedures were applied and differences between grade levels and by grade level and gender were analyzed using the chi square test.

Results and Discussion

Nutrition. With regard to fruit consumption, about 51 percent of all students reported eating at least two helpings of fruit yesterday, 47 percent had eaten at least three helpings of vegetables yesterday, and about 41 percent had eaten six helpings of cereals, bread, rice, and pasta yesterday (**Table 1**). There was a significant difference between the grade levels for fruit consumption (chi square test, $p = .013$), for vegetables ($p = .001$), and for breads ($p = .009$). There were no differences by grade level and gender (e.g., kindergarten boys ate as much fruit as kindergarten girls, fifth-grade boys ate as many cereals, breads, rice, and pasta dishes as fifth-grade girls, and so on). These data suggest that less than half of the youngsters in this sample eat the recommended number of fruits, vegetables, and grain products each day. These findings parallel those of Krebs-Smith et al. (1996), who found that children and adolescent fruit and vegetable intake is inadequate for this age group.

Tobacco and Alcohol. Figure 1 shows the proportion of students who have ever tried drinking alcohol, chewing tobacco or snuff, or smoking a cigarette. Responses show an age-related trend, in which use is low in the early grades but increases with age. These differences are statistically significant for each substance studied (alcohol, $p<.001$; chewing tobacco or snuff, $p<.001$; cigarettes, $p=.037$). With regard to smoking cigarettes, only third-grade boys reported smoking more than third-grade girls ($p=.007$), mirroring the trend in the United States that suggests both males and females smoke at about the same rates. For example, Hu, Lin, and Keeler (1998) concluded in their study based on the California Youth Tobacco Survey that there were no differences between male and female teen smoking rates. In three grades, males used alcohol and chewing tobacco or snuff significantly more than females. Most striking, sixth grade boys drank significantly more than sixth-grade girls in this sample (27.94 percent compared to 17.99 percent, $p=.038$). The time period between the fifth and sixth grades is when use of these products increases significantly. These

Figure 1. Percentage Responding "Yes" to Ever Having Tried Tobacco or Alcohol, by Grade Level



a) beer, wine, or liquor; b) chewing tobacco or snuff; c) cigarettes

Source: Southern Illinois School Children Survey, Fall 1998.

Table 1. Percentage of Students Responding "Yes" to Nutrition Questions, by Grade Level

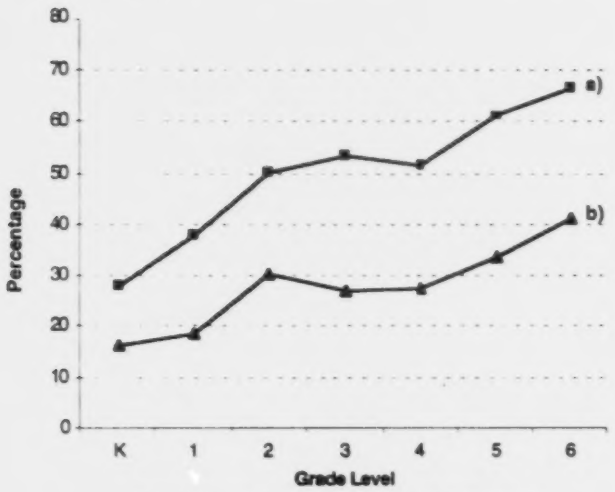
Question	*K*	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
Did you eat at least 2 helpings of fruit yesterday?	52.36	44.04	55.67	55.36	54.08	50.21	44.69	50.91
Did you eat at least 3 helpings of vegetables yesterday?	46.83	39.53	52.58	59.21	45.39	46.84	38.46	46.93
Did you least at least 6 helpings of cereals, bread, rice, and pasta yesterday?	45.31	39.87	45.70	43.88	31.63	40.25	38.46	40.64

Source: Southern Illinois School Children Survey, Fall 1998.

data suggest that prevention programs must be implemented by the third or fourth grade to address the problem of experimentation with these drugs in this population.

Fighting. Given recent media attention regarding violence in the schools, a series of questions was asked related to fighting and weapon carrying. **Figure 2** shows the percentage of students who had been involved in a fight and, more specifically, those who had been involved in a fight at school. The proportion of students reporting being involved in a fight in which someone was hurt in some way increases significantly with age, both for the general question as well as the school-specific item. By the sixth grade, 67 percent of the students had been involved in a fight where someone was punched, kicked, or hurt in some way, and 41 percent of the sixth graders had been in a fight at school in which someone was hurt. For each grade, significantly more boys than girls reported being involved in a fight. For example, 80.6 percent of sixth-grade boys reported being in a fight in which someone was punched, kicked, or hurt in some way, compared to 53.24 percent of sixth-grade girls. These findings are similar to those of a study conducted by Boulton (1993) in England, who found that boys were much more likely to be involved in fights than girls.

Figure 2. Percentage Responding "Yes" to Having Been in a Fight, by Grade Level

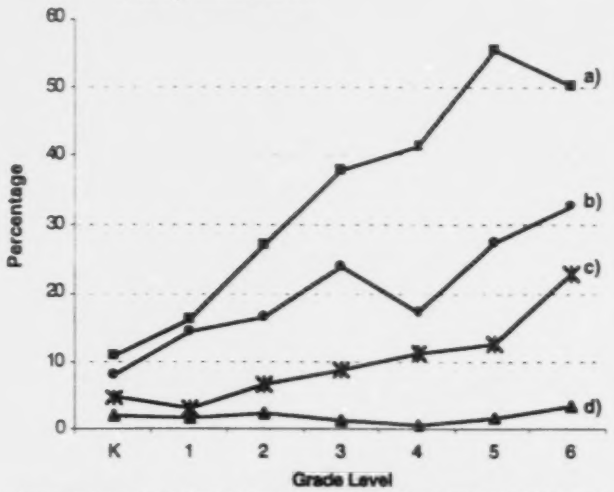


a) someone was hurt; b) someone was hurt at school

Source: Southern Illinois School Children Survey, Fall 1998.

Weapons. Four questions were asked regarding weapon carrying (**Figure 3**). The general question asking "Have you ever carried, used, or shot a gun?" showed an increase from 11 percent in kindergarten to 56 percent in the fifth grade

Figure 3. Percentage Responding "Yes" to Gun and Knife Use, by Grade Level



a) ever carried, used, or shot a gun; b) someone you know ever brought a gun or knife to school; c) ever shot a gun without an adult present; d) ever brought a gun or knife to school

Source: Southern Illinois School Children Survey, Fall 1998.

(p<.001). Shooting a gun without an adult present increased from 5 percent in kindergarten to 23 percent in the sixth grade (p<.001). Less than 2 percent reported bringing a gun or knife to school but about 20 percent indicated they knew someone who had brought a gun or knife to school. This increased significantly (p<.001) from 8 percent in kindergarten to 33 percent in the sixth grade.

When analyzed by grade level and gender, "ever carried, used, or shot a gun," and "ever shot a gun without an adult present" varied significantly for each grade level, with males having engaged in this behavior significantly more than females. In two grades, more males than females knew someone who had brought a gun or knife to school. There were no significant differences between boys and girls by grade level when asked the question "Have you ever brought a gun or knife to school?". Given the *Draft Objectives for Healthy People 2010* (1998) to reduce the prevalence of weapon carrying by adolescents in grades nine through twelve to less than 15 percent, it is clear that much needs to be done to meet this objective. Of special concern is the proportion of youngsters who reported they have shot a gun without an adult present and the 20 percent of students who said they knew someone who brought a gun or knife to school.

Physical Activity. The study found only 8 percent of students walked or rode a bike to school. This is not a surprising finding given that a large proportion of the students ride the school bus each day. About 52 percent of the

Table 2. Percentage of Students Responding "Yes" to Physical Activity Questions, by Grade Level

Question	*K*	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
Do you walk to school?*	9.02	6.19	9.09	4.25	4.14	9.64	16.08	8.31
Do you play on a sports team?	35.41	37.62	53.42	65.12	54.08	53.88	59.34	51.19
Do you ride a bike everyday?*	52.97	50.52	54.10	58.91	51.10	52.19	41.34	51.58

*Note: based on students who walk or ride a bike to school

Source: Southern Illinois School Children Survey, Fall 1998.

sample rode a bike each day; however, this percentage decreases with age, so by the sixth grade, only 42 percent report riding a bike every day. Playing on a sports team increased from about 35 percent in kindergarten to a high of 65 percent in the third grade. On average, 52 percent of the youngsters in this sample indicated they played on a sports team (**Table 2**).

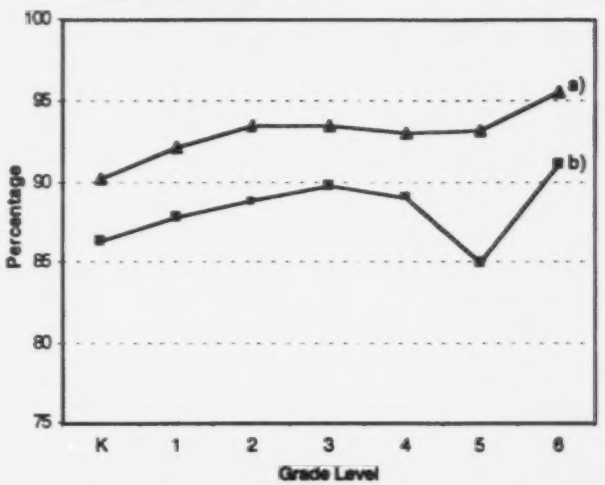
When analyzed by grade level and gender, only sixth-grade boys showed significantly higher rates of walking to school than sixth-grade girls (p=.011). More boys than girls from kindergarten to fourth grade played on a sports team, but for the fifth and sixth grades, there were no significant differences on this variable. This trend was somewhat reversed regarding bike riding. Whereas there was no difference between boys and girls from kindergarten to third grade, from fourth to sixth grade, more boys than girls reported riding bicycles daily. These data highlight the importance of school physical education programs. Only about 50 percent of the youngsters ride a bike each day or play on a sports team and only 8 percent walk to school. It is clear that school physical education programs are an important part of the curriculum which help students develop life skills and healthy habits regarding exercise and fitness.

Seatbelt and Helmet Use. About 89 percent of the sample reported wearing a seatbelt each time they rode in a car (**Table 3**). This rate decreased significantly from 94 percent in kindergarten to 77 percent in the sixth grade (p<.001). There was no significant difference between boys and girls, with the exception of the sixth graders, where 83.94 percent of girls reported wearing seatbelts, compared to 70.45 percent of boys.

A similar age-related trend is found in helmet use when riding a bike (p<.001). Of youngsters who rode a bike, those in the younger grades were more likely to wear a helmet than those in the older grades (**Table 3**). For example, 56 percent of second graders said they wore a helmet when they rode their bike, while only 19 percent of sixth graders reported doing so. When analyzed by grade level and gender, kindergarten and third-grade girls reported more helmet use than boys; otherwise, there were no significant differences by gender. These overall results are similar to those reported by Liller et al. (1998), who found that only 15.8 percent of their middle school sample reported wearing a helmet the last time they rode bicycles.

Personal Hygiene. The final set of questions focused on personal hygiene. About 88 percent of the students reported

Figure 4. Percentage Responding "Yes" to Personal Hygiene, by Grade Level



a) wash your hands after going to the bathroom; b) brush your teeth every day

Source: Southern Illinois School Children Survey, Fall 1998.

Question	*K*	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
Do you wear a seatbelt when you ride in the car?	93.77	91.96	92.15	88.17	89.76	86.32	77.32	88.64
Do you wear your helmet when you ride your bike?*	50.0	48.97	56.25	51.55	36.84	30.56	18.60	42.21

*Based on students who reported riding a bike

Source: Southern Illinois School Children Survey, Fall 1998.

brushing their teeth every day and 93 percent reported washing their hands after going to the bathroom (**Figure 4**). Tooth brushing and hand washing did not vary by grade level; however, more fifth-grade girls than boys reported brushing their teeth (p=.013) and more first- and third-grade girls indicated that they washed their hands each time after going to the bathroom.

Methodological Note. A frequent question regarding these data is whether they are true and how accurately they reflect child health behaviors. As McDermott and Sarvela (1999) indicate, school officials, teachers, parents, physicians, and researchers rightly ask about the reliability and value of these instruments. This is a fair question and worthy of discussion. In order to address this question, we first need to study the reliability and validity of the questionnaire and next examine the appropriateness of the data collection procedures.

From a reliability perspective, the behavioral question subscale shows adequate internal-consistency reliability at .60 based on Cronbach's alpha. This estimate of reliability reflects the fact that the items are not all homogeneous in nature and do measure different things (e.g., Do you play on a sports team? or, Have you ever tried smoking a cigarette?). For these reasons, internal-consistency reliability is lower than would be expected if the survey examined a single topic (only studied cigarette smoking behavior, for example). In addition, when comparing the results from the 1997 study to the present study, findings are similar, indicating that these populations are consistently reporting similar behaviors over time.

From a validity perspective, it should be noted that the items were based on *Healthy People 2000* (1990) objectives, which were developed based on input from experts throughout the country. Secondly, the instrument had been pilot-tested with a large sample of over 1,000 youngsters in the 1997 study and revised on the basis of that study.

Finally, the instrument has gone through various reviews, not only from content experts, but from reading and early childhood development specialists who have confirmed that the approach is a valid and reliable method of collecting data. These procedures show that we have developed a reliable and valid approach for collecting data from kindergarten through sixth-grade students.

Conclusions

Several age-related trends regarding health behaviors are present in this population. In general, the older the youngster, the less likely she or he will engage in positive health behaviors. For example, sixth graders are more likely to have tried alcohol, chewing tobacco, or cigarettes than their younger counterparts. Sixth graders are less likely to use a helmet when they ride bikes and are also less likely to use seatbelts when they are in a car. Regarding nutrition and personal hygiene, the children appear to behave more similar to each other than different when data are analyzed by grade level.

When analyzed by grade level and gender, the results are also more similar than different for most behaviors. For example, the same number of fourth-grade boys ate at least three helpings of vegetables as did the fourth-grade girls. For alcohol and chewing tobacco at a couple of grade levels, more boys than girls engaged in this behavior; only in the third grade did more boys than girls report ever trying to smoke a cigarette, however. There were also some gender related differences regarding exercise behaviors. The most consistent differences between boys and girls by grade level regarded fighting behavior and weapons. For each of these, boys reported higher rates than girls (e.g., 39.55 percent of sixth-grade boys reported shooting a gun without an adult present compared to 7.19 percent of sixth-grade girls).

The *Draft Objectives for Healthy People 2010* (1998) suggest that educational programs, policy, and environmental strategies can be used to influence knowledge, attitudes, skills, behaviors, policies, environmental measures, and social supports. This three-point approach emphasizes community-based strategies as effective means for influencing behavior rather than simply using educational approaches. Research supports this perspective. For example, Vartiainen, Paavola, McAlister, and Puska (1998) demonstrated through a 15 year follow-up study conducted in Finland that students who were enrolled in four intervention schools using a community-based prevention model had a 22 percent lower lifetime cigarette consumption rate than students who had been enrolled in two control schools. Their data suggest that school-based programs implemented in partnership with community health programs and focused mass media activities reduce the problem of smoking among youth and young adult populations. Another smoking-related randomized community trial conducted in Minnesota by Forster et al. (1998) indicated that when communities change ordinances, merchant policies, and enforcement practices there is a significant positive effect in cigarette use among underage users. Their data suggest that "comprehensive ordinances passed in all intervention communities resulted in a lower smoking prevalence among young adolescents in these communities than in control communities" (p. 1196).

Each of the behaviors in this study has potential for community-based interventions. Ideally, a comprehensive school health program would be implemented to address these health behavior issues in concert with public health programming and reinforced by visits to the family doctor or other health care provider. Using a multicomponent community-based strategy, the health behaviors of children can be effectively shaped to help them develop healthy habits that will serve them well throughout their lifespan.

References

Boulton, M. J. 1993. Proximate causes of aggregate fighting in middle school children. *British Journal of Educational Psychology* 63: 231-244.

Elders, J. 1994. Violence as a public health issue for children. *Childhood Education* 70(5): 409-414.

Fitzpatrick, K. M. 1993. Fighting among America's youth: A risk and protective factors approach. *Journal of Health and Social Behavior* 38(6): 131-148.

Forster, J. L., D. M. Murray, M. Wolfson, T. M. Blain, A. C. Wagenaar, and D. J. Hennrikus. 1998. The effects of community policies to reduce youth access to tobacco. *American Journal of Public Health* 88(8): 1193-1198.

Hu, T., Z. Lin, and T. E. Keeler. 1998. Teenage smoking, attempts to quit, and school performance. *American Journal of Public Health* 88(4): 940-943.

IPLAN. 1996. *Illinois Project for Local Assessment of Needs Data Set: 1996.* Springfield: Illinois Department of Public Health.

Jones, C. S., W. King, D. Poteet-Johnson, and M. Q. Wang. 1993. Prevention of bicycle related injuries in childhood: Role of the caregiver. *Southern Medical Journal* 86(8): 859-864.

Kimmel, S. R., and R. W. Nagel. 1990. Bicycle safety knowledge and behavior in school age children. *The Journal of Family Practice* 30(6): 677-680.

Krebs-Smith, S. M., A. Cook, A. F. Subar, L. Cleveland, J. Friday, and L. L. Kahle. 1996. Fruit and vegetable intakes of children and adolescents in the United States. *Archives of Pediatric and Adolescent Medicine* 150 (January): 81-86.

Liller, K. D., B. Morissette, V. Noland, and R. J. McDermott. 1998. Middle school students and bicycle helmet use: Knowledge, attitudes, beliefs, and behaviors. *Journal of School Health* 68(8): 325-328.

Loveland-Cherry, C. J., S. Leech, V. B. Laetz, and T. E. Dielman. 1996. Correlates of alcohol use and misuse in fourth grade children: Psychological, peer, parental, and family factors. *Health Education Quarterly* 23(4): 497-511.

Master, D., S. H. Hess-Longe, and H. Dickson. 1997. Scheduled hand washing in an elementary school population. *Family Medicine* 29(5): 336-339.

Manun'Ebo, M., S. Cousens, P. Haggerty, M. Kalengaie, A. Ashworth, and B. Kirkwood. 1997. Measuring hygiene practices: A comparison of questionnaires with direct observations in rural Zaire. *Tropical Medicine and International Health* 2(11): 1015-1021.

McDermott, R. J., and P. D. Sarvela. 1999. *Health Education Evaluation and Measurement: A Practitioner's Perspective* (2nd ed.). Madison, WI: WCB/McGraw-Hill.

Stevens, M., F. Youells, R. Whaley, and S. Linsey. 1991. Prevalence and correlates of alcohol use in a survey of rural elementary school students: The New Hampshire Study. *Journal of Drug Education* 21(4): 333-347.

U.S. Department of Health and Human Service (USDHHS). 1990. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* Washington, DC: USDHHS.

USDHHS. 1998. *Draft Objectives for Healthy People 2010.* Washington, DC: USDHHS.

Vartiainen, E., M. Paavola, A. McAlister, and P. Puska. 1998. Fifteen year follow-up of smoking prevention effects in the North Karelia Youth Project. *American Journal of Public Health* 88(1): 81-85.

Wilson, J. M., and G. N. Chandler. 1992. Hand washing reduces diarrheal diseases amongst tribals of Car Nicobar Island, India. *Indian Journal of Public Health* 36(4): 133-137.

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